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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* ROBERT D. FELDMAN,  
JANET M. GREENBERG, MILE RADOVANOVIC,  
S. R. THANGAVELU, and WILLIAM A. THOMPSON

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Appeal 2009-004681  
Application 10/092,746  
Technology Center 2600

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Decided: August 20, 2009

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Before KENNETH W. HAIRSTON, JOSEPH F. RUGGIERO,  
and BRADLEY W. BAUMEISTER, *Administrative Patent Judges*.

HAIRSTON, *Administrative Patent Judge*.

DECISION ON APPEAL

### STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1, 3 to 10, 12 to 14, 16, and 18 to 20.<sup>1</sup> We have jurisdiction under 35 U.S.C. § 6(b).

We will sustain the rejection.

Appellants' invention is concerned with a method, network element, and apparatus for controlling power levels in optical fibers when a fault occurs in the optical fiber path.<sup>2</sup> Appellants recognize that it is desirable to reduce power level in optical fibers due to faults (e.g., a fiber cut, removed connector, or other discontinuity in the optical fiber path) in order to prevent possible injury (which is proportional to output power and time of exposure).<sup>3</sup> Appellants' claimed invention is directed to a method, network element, and apparatus for controlling power level in an optical fiber path using a "counter-propagating supervisory signal."<sup>4</sup>

Claim 1, reproduced below, is representative of the subject matter on appeal:

1. A method, comprising:

reducing the power level of an optical data signal propagating in an optical fiber path in response to a loss of a counter-propagating supervisory signal in the optical fiber path;

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<sup>1</sup> Claims 2, 11, 15, 17, and 21 have been canceled.

<sup>2</sup> Spec. 1:5-8.

<sup>3</sup> See Spec. 1:24-27.

<sup>4</sup> See generally Spec. 2:9-20; claims 1, 10, 16, and 20.

reducing counter-propagating optical power in response to a loss of the optical data signal; and

responsive to the loss of the optical data signal, reducing counter-propagating optical signal power output from at least one additional network element by a predetermined amount.

The Examiner relies upon the following as evidence of unpatentability:

Rowley	US 4,833,668	May 23, 1989
Maddocks	US 6,483,616 B1	Nov. 19, 2002

The following sole rejection is before us for review:  
Claims 1, 3 to 10, 12 to 14, 16, and 18 to 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Maddocks and Rowley.

Appellants argue (App. Br. 12-13), *inter alia*, that Maddocks fails to teach or suggest a *counter*-propagating supervisory signal, and instead teaches a *co*-propagating supervisory signal. Appellants argue (App. Br. 14) that Maddock's supervisory signal is not *in the optical path* of associated light guides 5 and 6 and that the loss of a supervisory signal in Maddocks is unrelated to detecting a fault on the associated light guide 5 and 6. Appellants also argue (App. Br. 15; Reply 4) that Rowley fails to teach or suggest a supervisory signal or control, and that in Rowley a baseband of a communicated signal is examined to determine faults, as opposed to the supervisory signal as set forth in claim 1.

Appellants make the foregoing arguments based primarily on an analysis of claim 1 with respect to the teachings of Maddocks and Rowley.<sup>5</sup> All independent claims 1, 10, 16, and 20 contain the general feature of reducing a power level of an optical data signal in an optical fiber path in response to a detected loss of a counter-propagating supervisory signal. We consider claim 1 as being representative of the group of claims (claims 1, 3 to 10, 12 to 14, 16, and 18 to 20) which stand rejected under 35 U.S.C. § 103(a) as unpatentable over Maddocks and Rowley. *See* 37 C.F.R. § 41.37(c)(1)(vii).

#### ISSUE

Based on Appellants' arguments, the issue is: Have Appellants demonstrated that the Examiner erred in finding that Maddocks and Rowley, whether singly or in combination, teaches "reducing the power level of an optical data signal propagating in an optical fiber path in response to a loss of a counter-propagating supervisory signal in the optical fiber path," as set forth in representative claim 1?

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<sup>5</sup> *See* App. Br. 11; Reply Br. 2 (Appellants present specific arguments only as to claim 1). *See also* App. Br. 16; Reply Br. 5 (Appellants present nominal arguments as to remaining claims 3 to 10, 12 to 14, 16, and 18 to 20, relying on the substance of the arguments with regard to claim 1 for patentability of the remaining claims).

## FINDINGS OF FACT

1. As indicated *supra*, Appellants describe and claim a method, network element, and apparatus for controlling power level of an optical signal 112 in an optical fiber 103 using a counter-propagating supervisory signal 114 (*see* Fig. 1). The method includes reducing a power level of an optical data signal 112 which propagates in an optical fiber path 110 in response to loss of the counter-propagating supervisory signal 114 in the same optical fiber path 110 (*see generally* Abstract; Figs. 3, 4; claim 1). The reduction of power is to reduce the extent of injury or harm in case of a fault in the optical fiber path causing optical emanations (Spec. 1:24-27, 8:15-19).

2. Appellants disclose that:

... [A] supervisory signal 114 is transmitted between end terminals 102 through optical fiber 110 such that the supervisory signal 114 counter-propagates with the optical data signal 112. That is, the supervisory signal 114 propagates along optical transmission lines 103 and 107 against the optical data signal 112.

Spec. 4:30-5:1.

3. Maddocks describes a method for controlling power level in response to faults in optical fibers 5 and 6 where power level of an optical data signal is reduced at amplifier 8 before transmission across fiber 5, and a supervisory signal going across optical fiber 6 from supervisory insert 16 is reduced in power by shutting it completely off (*see generally* Fig. 1; col. 1, l. 25 to col. 3, l. 58). Maddocks describes both fibers 5 and 6 as carrying “unidirectional signal[s]” (col. 2, ll. 57-

60), and discloses that one alternative to using two fibers is to use “a single optical fibre to carry bidirectional traffic” (col. 3, ll. 43-44).

4. Thus, Maddocks specifically describes that there may either be two optical fibers 5 and 6 (col. 1, ll. 56-58; col. 2, ll. 16-18, 57-60), or that there may be only one single optical fiber (col. 1, ll. 58-62; col. 3, ll. 43-48).
5. Maddocks recognizes the same need as Appellants for protecting personnel from high optical outputs when fibers are damaged or broken (col. 2, ll. 63-67), and provides a solution of shutting down high power laser beams emitting from amplifiers 15 and 8 in response to detected signal losses (col. 2, l. 67 to col. 3, l. 11).
6. Rowley (Fig. 2), like both Maddocks and Appellants, describes an optical fiber system having “supervisory signals” (*see* col. 3, ll. 48-51) propagating from supervisory and error detector circuits 16 and 16’. In addition, data is transmitted by transmitters 14 and 14’. Thus, Rowley describes a single optical path 3 (col. 4, ll. 52-55), in which data is transmitted in one direction from transmitters 14/14’ across optical path 3, and counter-propagating supervisory signals are propagated in the opposite direction across path 3 from the corresponding supervisory and error detector circuit 16’/16 (col. 5, ll. 11-53).
7. As stated by Rowley:

To increase the capacity of an optical fibre transmission line the line is modified as shown in Figure 1 by the inclusion of directional optical couplers 1 and 2 which are spliced onto a single optical fibre transmission line 3

and which sort the signals on the single optical fibre transmission line 3 in accordance with the direction of their travel.

Column 4, lines 49-55.

“Thus, once the transmission line 3 has the optical couplers 1 and 2 spliced to it, it appears to its ends exactly the same as a conventional two fibre transmission line. . . .” (column 5, ll. 1-4).

## PRINCIPLES OF LAW

### *Claim Construction*

“During examination, ‘claims . . . are to be given their broadest reasonable interpretation consistent with the specification, and . . . claim language should be read in light of the specification as it would be interpreted by one of ordinary skill in the art.’” *In re Am. Acad. of Sci. Tech Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004) (citation omitted); *In re Morris*, 127 F.3d 1048, 1054 (Fed. Cir. 1997). “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (citation omitted).

### *Obviousness*

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). The

Examiner's articulated reasoning in the rejection must possess a rational underpinning to support the legal conclusion of obviousness. *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006).

The Examiner bears the initial burden of presenting a prima facie case of obviousness, and Appellants have the burden of presenting a rebuttal to the prima facie case. *In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992). Appellants have the burden on appeal to the Board to demonstrate error in the Examiner's position. *See Kahn*, 441 F.3d at 985-86.

## ANALYSIS

### *Claim 1*

We will sustain the Examiner's rejection with respect to representative claim 1 for the reasons that follow. We agree with the Examiner's findings of fact and conclusions of obviousness with respect to claim 1 (Ans. 3-5, 7-10), and adopt them as our own, along with some amplification of the Examiner's explanation of the teachings of Maddocks (FF 3-5) and Rowley (*see* FF 6, 7), as well as Appellants' Specification (*see* FF 1, 2). *See Fine*, 837 F.2d at 1073; *Kahn*, 441 F.3d at 988.

Representative claim 1, as well as claims 3 to 9 which ultimately depend on claim 1, all recite a method including "reducing the power level of an optical data signal propagating in an optical fiber path in response to a loss of a *counter-propagating supervisory signal in the optical fiber path*" (claim 1 (emphasis added)). The originally filed Specification supports *counter-propagating supervisory signal* as meaning a type of supervisory signal 114 that "propagates along optical transmission lines 103 and 107

against the optical data signal 112” (*see* FF 2). In other words, one of ordinary skill in the art would understand that a counter-propagating supervisory signal is one that runs counter, or in the opposite direction, to a data signal along an optical transmission line.

Claim 1 merely requires that the method employ one single “optical fiber path” which is transmitting “an optical data signal” and “a counter-propagating supervisory signal” with no limit on these signals being transmitted on either upstream or downstream optical fiber paths.<sup>6</sup> *See Am. Acad. of Sci. Tech Ctr.*, 367 F.3d at 1364. The phrase *counter-propagating supervisory signal* broadly encompasses a supervisory signal that is propagated counter to, or in an opposite direction in comparison to, another signal, and does not require by definition that the signals be physically located on the same, or different, optical fiber paths. *Id.*

A proper interpretation of claim 1, giving this claim its broadest reasonable interpretation consistent with the Specification as understood by one of ordinary skill in the art (*Phillips*, 415 F.3d at 1315), has to rely on the specific definition provided in the originally filed Specification. The Specification defines a counter-propagating supervisory signal as a signal that propagates along an optical transmission line “against the optical data signal” (FF 2).

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<sup>6</sup> Note that claim 16 on appeal is the only one of Appellants’ pending claims which recites an “upstream optical fiber path” and a “downstream optical fiber path,” as opposed to just one single “optical fiber path.” However, arguments which Appellants have not made are considered waived for purposes of this appeal. *See* 37 C.F.R. § 41.37(c)(1)(vii).

As indicated *supra* (FF 3-5), Maddocks describes all of the elements of claim 1 including reducing the power level of an optical data signal propagating in an optical fiber path in response to a loss of a counter-propagating supervisory signal. Maddocks strongly suggests modifying the system and method having two unidirectional fibers 5 and 6 to a system and method employing a single bidirectional fiber (FF 3, 4), thus, resulting in a modification to Maddocks yielding a single bidirectional fiber having both a data signal and a supervisory signal propagating in both directions (i.e., including a counter-propagating supervisory signal). In other words, claim 1 is taught or suggested by Maddocks, whether considered alone or in combination with Rowley, and the teachings of Rowley are cumulative of what is disclosed by Maddocks.

Maddocks, whether modified to include a single optical fiber (*see* FF 3, 4), or as modified to include the teachings of Rowley of a single optical transmission line 3 (*see* FF 6, 7), teaches or suggests a counter-propagating supervisory signal on a single bidirectional optical fiber as set forth in representative claim 1. Thus, Appellants have not demonstrated that the Examiner erred in relying on the combination of Maddocks and Rowley as teaching or suggesting an apparatus and method for controlling optical power level in a single optical fiber path using a counter-propagating supervisory signal, at least to the extent that this feature is broadly set forth in claim 1. *See Am. Acad. of Sci. Tech Ctr.*, 367 F.3d at 1364.

The Examiner has provided articulated reasoning with a rational underpinning to support the combination for the legal conclusion of obviousness (Ans. 3-10). *See Kahn*, 441 F.3d at 988. We agree with the

Examiner that both Maddocks and Rowley teach an optical transmission system, network element, and method for transmitting data and supervisory signals (Ans. 3-9), and we find that Maddocks alone teaches or suggests all of the limitations of claim 1. In fact, Maddocks and Appellants both recognize the disadvantage of harm to an operator caused by potential optical fiber faults (FF 1, 5), and solve that problem by employing a supervisory signal to reduce or shut off optical power.

We also agree with the Examiner that it would have been obvious to modify Maddocks with the teachings of Rowley in order to reduce the time for detecting a fiber break (Ans. 5), and to reduce costs by using one fiber (Ans. 7, 9). In addition, Rowley describes the advantage of using one fiber in place of two (as taught by Maddocks) as being to “increase the capacity of an optical fibre transmission line” (FF 7).

Once the Examiner has satisfied the burden of presenting a *prima facie* case of obviousness, the burden then shifts to Appellants to present evidence and/or arguments that persuasively rebut the Examiner's *prima facie* case. *See Oetiker*, 977 F.2d at 1445. Appellants' arguments (Reply Br. 5) that the Examiner erred in combining Maddocks with Rowley due to a lack of motivation being found in the prior art is unpersuasive since both Maddocks and Rowley teach or suggest using a single fiber (FF 3, 4, 6, 7). Furthermore, Appellants' argument (Reply Br. 4-5) that the combination of Maddocks and Rowley is improper is moot in view of our finding that Maddocks alone teaches or suggests the limitations of claim 1. In view of our discussion as to the teachings and suggestions of Maddocks and Rowley *supra*, Appellants have not demonstrated that the Examiner erred in

determining that Maddocks and Rowley teach or suggest reducing the power level of an optical data signal propagating in an optical fiber path in response to a loss of a counter-propagating supervisory signal in the optical fiber path.

With regard to Appellants' argument (Reply Br. 4) that Rowley has no separate counter-propagating "control" signal, this argument is unpersuasive inasmuch as it is not commensurate with the terminology set forth in claim 1 of, counter-propagating supervisory *signal*. The word "control" does not appear in claim 1.

With regard to Appellant's argument (Reply Br. 4) that Rowley only teaches detecting a fault in the fiber "when the inverted data is received," this argument is unpersuasive in light of Rowley's alternative teaching, noted by the Examiner (*see* Ans. 10), that such inversion alters "supervisory signals" which are used in the optical transmission method (FF 6).

In view of the foregoing, we will sustain the obviousness rejection of claim 1 based upon the teachings of Maddocks and Rowley.<sup>7</sup>

*Claims 3 to 10, 12 to 14, 16, and 18 to 20*

We agree with the Examiner's findings of fact and conclusions of obviousness with respect to claims 3 to 10, 12 to 14, 16, and 18 to 20 (Ans. 5-7), and adopt them as our own. The Examiner has provided articulated reasoning with a rational underpinning to support a legal conclusion of obviousness based upon the teachings of the applied references (Ans. 3-11).

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<sup>7</sup> The same holds true for claims 3 to 9, which ultimately depend from claim 1, because Appellants have not presented any patentability arguments for these claims apart from the arguments presented for claim 1 (*see* App. Br. 16; Reply Br. 5).

Once the Examiner has satisfied the burden of presenting a prima facie case of obviousness, the burden then shifts to Appellants to present evidence and/or arguments that persuasively rebut the Examiner's prima facie case. *See Oetiker*, 977 F.2d at 1445.

Appellants have not presented any patentability arguments as to claims 3 to 10, 12 to 14, 16, and 18 to 20, other than stating that (i) the Examiner failed to make a prima facie case of obviousness with regard to claims 10, 16, and 20 for the same reasons as claim 1, and (ii) claims 3 to 9, 12 to 14, and 18 to 20 each recite additional features and depend respectively from claims 1, 10, 16, and 20 (*see* App. Br. 16; Reply Br. 5).

Since Appellants have not particularly pointed out errors in the Examiner's reasoning to persuasively rebut the Examiner's prima facie case of obviousness, the rejection of claims 3 to 10, 12 to 14, 16, and 18 to 20 is therefore sustained.

#### CONCLUSION OF LAW

Appellants have not shown that the Examiner erred in finding that Maddocks and Rowley, whether singly or in combination, teach "reducing the power level of an optical data signal propagating in an optical fiber path in response to a loss of a counter-propagating supervisory signal in the optical fiber path," as set forth in representative claim 1.

#### ORDER

The decision of the Examiner to reject claims 1, 3 to 10, 12 to 14, 16, and 18 to 20 is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

KIS

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